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The Effects Of Highlighting Healthy Options On Consumer Food Choices In A Food Bank Setting

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THE EFFECTS OF HIGHLIGHTING HEALTHY OPTIONS ON CONSUMER FOOD CHOICES IN A FOOD BANK SETTING

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41 Pages

Objective: The purpose of this study was to determine the effects of highlighting healthy food options on consumer food choices in a food bank setting.

Methods: Two community food banks participated in this study. One food bank served as the control, while a second food bank was rearranged so that fresh produce and other healthy products were the first options that shoppers encountered upon entering. After shopping, carts were inventoried for healthy vs non-healthy products. Composition of the carts from the control food bank were then compared to the contents of the carts from the intervention food bank.

Results: A total of 72 food bank users consented to participate in this study. Of the 72 participants, 38 were sampled at the control food bank and 34 were from the intervention food bank. Independent t-tests were used to evaluate the differences between the numbers of healthy food products taken from each category in the control food bank compared to the intervention food bank. Participants from the intervention food bank chose significantly more fresh fruits ($p<0.001$), fresh vegetables ($p<0.001$), canned vegetables (<0.001), frozen vegetables ($p=0.004$), nuts ($p=<0.001$), dairy products ($p=0.015$), and margarine ($p=0.032$).

Conclusion: This study provided evidence that highlighting healthy foods increases the number of fruits, vegetables, nuts, dairy products, and margarine chosen by food bank users. These are significant data that can aid food banks and other similar settings in encouraging

participants to choose nutritious food options, potentially leading to a healthier population of those that would be food insecure without food banks.

KEYWORDS: food bank; nutrition; food insecurity; food choices; fruits; vegetables

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K.N.G.

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Introduction

According to the United States Department of Agriculture's Economic Research Service, 11.8 percent of households in the United States experienced food insecurity in 2017 (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2018). Food insecurity leads to the absence of consistently healthy meals, which in turn, can have detrimental effects on the health of those that are food insecure. According to Laraia (2013), food insecurity has been associated with diabetes, as well as obesity and weight gain. Furthermore, Seligman, Laraia, and Kushel (2010) reported that food insecurity is also related to the incidence of hypertension. Food insecurity leads to a decrease in fruit and vegetable consumption, which can cause further harmful nutrition-related health effects (Laraia, 2013). In response to the nation's large food insecure population, thousands of food banks and food pantries have been created to provide food to those in need. Most food banks operate based on donations, meaning the nutritional content of the food available at food banks may be inconsistent. Although some food banks and pantries offer healthy foods and fresh produce, it is unclear whether or not these healthy items are popular among food bank users. It is unknown whether those utilizing food banks are concerned with obtaining healthy foods, or if their main priority is receiving food in general, regardless of nutritional value. Currently, there are limited studies that have been conducted on whether or not highlighting healthy foods in a food bank setting will increase the number of healthy items that are chosen by food bank participants.

Though there is limited research on the effects of emphasizing healthy food products in a food bank setting, many studies have been conducted on the effects of highlighting healthy foods

in other locations. For example, studies have been done in grocery stores, dining halls, and convenience stores demonstrating success of strategies such as product placement and manipulation of store layout to encourage consumers to purchase healthy products. Nonetheless, there is still a gap in literature when discussing the effects of emphasizing healthy foods in food banks. Therefore, a major deficiency in past research is the lack of information on food banks and the factors affecting the food-based decision making process for the food insecure.

Because there are currently limited studies that have evaluated the efficacy of highlighting healthy foods in food banks, this study produced novel information. Furthermore, the results of the study provide significant data that can aid food banks and other similar settings in encouraging participants to choose nutritious food options, potentially leading to a healthier population of those that would be food insecure without food banks.

The purpose of this study was to determine the effects of highlighting healthy food options on consumer food choices in a food bank setting. It was hypothesized that highlighting nutritious foods in a food bank setting will increase the amount of fruits, vegetables, high fiber whole grains, and low sugar, sodium, and saturated fat products that are chosen by food bank participants. The independent variable was defined as highlighting healthy food choices. Healthy food choices were determined according to the criteria set forth by two local registered dietitians. The dependent variable was defined as food choices of the food bank users. The participants of this study were those who receive food from specific food banks in the Midwestern United States.

Methodology

Sample

The sampling procedure for this study was a convenience sample of food bank participants from two different Midwestern United States food banks. The food banks were chosen due to their willingness to participate, as well as their ideal locations. The designated food banks were similar in size and in lay-out. Additionally, the two food banks had comparable numbers of shoppers each week. Inclusion criteria for this study was all willing food bank patrons attending the food bank on data collection days that were at least 18 years of age. Exclusion criteria was anyone under the age of 18. Food bank users willing to participate in the study signed an informed consent form before participation. Participants had the option of having the informed consent form read to them. The Illinois State University Institutional Review Board approved the protocol for this study.

Materials

A survey was created to obtain basic demographic information from the participants (see Appendix B). The survey contained eight questions and asked basic information such as gender, age, and ethnicity/race. In addition, the survey asked about the number of people per participant household, how many people in the household were under the age of 18, if anyone in the household had been diagnosed with heart disease, diabetes, or high blood pressure, the number of times the participant utilized the food bank per month, and shopper's role in the food system in their household. The survey was only completed by those willing to participate in the study and who had signed the informed consent form. Participants had the option of having the survey sheet read to them. Participants' names were not written on the survey sheets. In addition to the demographic survey, an inventory checklist form was also created and utilized to record what

was in participants' shopping carts. Participants' names were not written on the inventory checklist forms.

Intervention

While one food bank served as the control (food bank A), the second food bank displayed the intervention (food bank B). The intervention included re-arranging food bank B so that fresh produce and other healthy products were the very first options that shoppers encounter as they enter the food bank. This included setting up a "healthy choices" shelf, where low saturated fat, low sodium, low added sugar, high fiber, and other healthier products were distinguished from their unhealthy counterparts. Two registered dietitian nutritionists created a list of criteria that a product must meet in order to be deemed a "healthy choice" (Appendix A). These healthy choices were organized on to a shelf displaying signs designating that the shelf contained healthy options. The order that shoppers encountered the items at the intervention food bank was as follows: fresh produce, "healthy options" shelf, remaining canned and boxed food items, cold/freezer items, and finally the non-food items. Meanwhile, the control food bank operated under normal conditions, where healthy foods were not the first items shoppers encountered, nor were they highlighted. The control food bank was set up in a way in which shoppers encountered unsorted foods, with healthy and unhealthy options shelved together, and fresh produce last. Canned goods and boxed foods were combined regardless of fiber, sugar, sodium, and saturated fat content.

Procedures

Data collection methods were identical for both food banks. Each location had multiple two hour time slots for shopping each week. Data collection took place within these normal shopping hours. Data collection occurred as follows: food bank shoppers were asked to

participate in the study after completing all of their shopping. By talking to food bank users after they had finished shopping, researchers eliminated the possibility that shoppers altered their food choices due to the research study. After shoppers finished, researchers approached them to explain the research study and procedures. Those willing to participate signed an informed consent form and completed the demographic data collection survey (Appendix B). After obtaining consent, researchers inventoried shoppers' carts, counting and recording the total number of food items. Additionally, researchers recorded the number of grains, fresh fruits, fresh vegetables, canned fruits, canned vegetables, frozen fruits, frozen vegetables, peanut butter, nuts and seeds, dairy products, and margarine that were considered "healthy choices." Researchers recorded this information on the inventory checklist form (Appendix C). After researchers inventoried their carts, each participant was given a $5 Walmart gift card to thank them for their willingness to partake in the study. The source of funding for gift cards was the Illinois State University Department of Family and Consumer Sciences' student research mini-grant.

Data Analysis

Data analysis was completed using IBM SPSS Statistics 24. Independent t-tests were used to evaluate the differences between the numbers of healthy food products taken from each category in the control food bank compared to the intervention food bank. Continuous variables were expressed as mean ± standard deviations. Additionally, demographic data was reported as percentages or means ± standard deviations. A p-value <0.05 was recognized as significant for all statistical analyses.

Results

Participant Demographics

A total of 72 food bank users consented to participate in this study. Of the 72 participants, 38 were sampled at the control food bank, and 34 were from the intervention food bank. The majority of participants from both food banks were female (74% control, 59% intervention). The majority of participants were Caucasian (68% control, 71% intervention). Furthermore, 11% from the control and 18% from the intervention food bank were African American while 11% from control and 9% from intervention were Hispanic/Latino. No Asian or Native American food bank users participated in this study (0% for control and intervention). When comparing the ages between the control and intervention food bank shoppers, the results were statistically significant ($p=0.006$). Participants from the control food bank were primarily between 26-41 (45%) and 42-64 years of age (45%). Meanwhile, 53% of the intervention food bank users were 41-64 years of age. In the control food bank, 53% reported no history of heart disease, diabetes, or hypertension in their household. Additionally, 5% reported diabetes, 16% reported hypertension, 16% reported hypertension and diabetes, and 11% reported heart disease, hypertension, and diabetes in their household. For the intervention food bank participants, 35% reported no heart disease, diabetes, or hypertension in their household. However, 6% intervention food bank participants reported diabetes, 18% reported hypertension, 3% reported heart disease and diabetes, 3% reported heart disease and hypertension, 24% reported diabetes and hypertension, and 12% reported heart disease, diabetes, and hypertension in their household.

Both food banks had similar statistics when it came to how many people per household. The number of people per household of control food bank participants was 3.74 ± 1.75. The number of people per household of intervention food bank participants was 3.06 ± 2.47.

Furthermore, participants from both food banks also had similar numbers of children under the age of 18 in their household. The number of children per household of control food bank participants was 1.47 ±1.35. The number of children per household of intervention food bank participants was 1.15 ±1.74. When it came to the participant's role in their household food system, most participants from both food banks were primarily responsible for both grocery shopping and preparing meals for their households (87% control, 94% intervention). Further demographic data from those who participated in this study are listed in Table 1.

Influence on Items Chosen from each Food Group

By counting the number of items in shoppers' carts, differences in the number of items chosen from particular food groups relating to the intervention were assessed. The differences in number of healthy items taken from each specific food group can be seen in Figure 1. When it came to grains, the differences between the control and intervention food banks did not reach statistical significance ($p=0.188$). In the control food bank, the mean number of healthy grains chosen was 0.84 ±1.31, and the mean of the intervention was 1.09 ±2.30. Peanut butter was also a non-significant category when it came to differences between the two food banks. The mean number of peanut butter jars taken from the control food banks was 0.32 ±.47 and the mean for the intervention food bank was 0.32 ±.64 ($p=0.557$). With a mean of 0.68 ±1.43, a significantly higher number of healthy nut products was taken from the intervention food bank than the mean of 0.05 ±.32 at the control food bank ($p<0.001$). Similarly, the mean of chosen dairy products from the intervention was 1.18 ±2.81, while the mean for the control food bank was only 0.55 ±.80 ($p=0.015$). The number of selected margarine products chosen was also significantly different between the two locations. The mean of margarine from the intervention was .03 ±.17, while the mean for the control food bank was .00 ±.00 ($p=0.032$).

The difference between the number of fresh fruits and vegetables chosen from the control food bank when compared to the intervention food bank was statistically significant. The mean number of fresh fruits chosen at the control food bank was 1.86 ±1.49, while the mean number of fresh fruits chosen at the intervention food bank was 7.59 ±8.62 ($p<0.001$). Furthermore, the mean number of fresh vegetables chosen at the control food bank was 1.97 ±2.34, while the mean number of fresh vegetables chosen at the intervention food bank was 14.91 ±15.18 ($p<0.001$). In addition, the number of canned and frozen vegetables that met criteria chosen from the intervention food bank was significantly greater than the number taken from the control food bank. The mean number of healthy canned vegetables chosen at the control food bank was 6.89 ±3.52, while the mean number of healthy canned vegetables chosen at the intervention food bank was 7.53 ±9.54 ($p<0.001$). Similarly, the mean number of frozen vegetables chosen at the control food bank was .00 ±.00, while the mean number of frozen vegetables chosen at the intervention food bank was .09 ±.39 ($p=0.004$). The difference between the number of canned and frozen fruits taken from each food bank was not statistically significant. The mean number of canned fruits chosen at the control food bank was 1.08 ±1.19, while the mean number of canned fruits chosen at the intervention food bank was .76 ±1.74 ($p=0.179$). Both food banks had a mean of .00 (± .00) for frozen fruit.

Overall, the total number of items taken per participant was significantly different between the two food banks. The mean number of total items in the control food bank users' shopping carts was 51.50 ±13.67, while the mean number of total items taken by the intervention food bank users was 82.06 ±48.95 ($p<0.001$). Additionally, the difference in the percent of total items that met the healthy choice criteria was also statistically significant between the two food banks. The mean number of items meeting healthy criteria at the control food bank was 27.88

±15.89, while the mean of healthy items at the intervention food bank was 41.89 ±23.88 ($p=0.020$).

Discussion

The purpose of this study was to determine the effects of highlighting healthy food options on consumer food choices in a food bank setting. Independent t-tests were used to evaluate the differences between the numbers of healthy food products taken from each category in the control food bank compared to the intervention food bank. The primary findings of this study indicate that when healthier options are highlighted, food bank shoppers are more likely to choose healthy fruits, vegetables, nuts, dairy products, and margarine than their unhealthy counterparts.

Participant demographics were largely similar between the control and intervention groups. More precisely, the majority of participants from both locations were Caucasian females. Additionally, participants from both food banks had similar numbers of people per household, as well as children per household. The vast majority of participants from each location also reported that when it came to their role in their food system at home, they were primarily in charge of both grocery shopping and preparing meals. In terms of age, the control food bank had equal number of participants between the ages of 26-41 and 42-64, while the intervention food bank shoppers were primarily between 41-64 years of age. When it came to reporting heart disease, diabetes, and hypertension in participants' households, both the control and intervention food bank yielded similar results. In general, food bank users from both locations reported comparable instances of diabetes, heart disease, hypertension, and any combination of the three diseases. Overall, the similarities between the participant demographics confirm that the two food banks utilized in this study were very comparable, which validates the results of this study.

Initially, it was hypothesized that highlighting nutritious foods in a food bank setting would increase the amount of fruits, vegetables, high fiber whole grains, and low sugar, sodium, and saturated fat products that were chosen by food bank participants. The results of this study indicated the initial hypothesis to be largely accurate. To determine the accuracy of the hypothesis, the study focused on a handful of specific types of food, specifically grains, fresh fruits and vegetables, canned fruits and vegetables, frozen fruits and vegetables, peanut butter, nuts, dairy products, and margarine that meet the specific criteria outlined in Appendix A. Outside of fruits and vegetables, the participants that utilized the food bank that highlighted nutritious foods chose more healthy dairy products when compared to the control food bank. This agrees with a study by Foster et al. (2014) which suggested that highlighting low-fat dairy products increased the number of skim and 1% milk chosen by grocery store consumers. Additionally, intervention food bank shoppers chose more healthy nuts and margarine products when compared to control food bank shoppers. However, it is noted that the mean number of nuts and margarine products taken from both locations was very low. Therefore, it may be assumed that nuts and margarine are not popular choices among food bank users, or that the two food banks in this study do not have large quantities of these products available to their shoppers.

There was no significant difference between the numbers of healthy grains chosen from each food bank. This could be due to the fact that the grain products offered at most food banks tend to be refined grains, rather than the preferred whole grains. Furthermore, the mean number of peanut butter meeting criteria did not reach statistical significance. In fact, the mean for both locations was equal. The only criteria for peanut butter to be deemed a “healthy choice” was to have less than 8 grams of sugar per serving. It is not unusual for standard peanut butter to have

less than 8 grams of sugar, which could be the reason the two food banks had equal means in terms of peanut butter.

The difference in number of fresh fruits and vegetables chosen between the control and intervention food banks was statistically significant. The intervention food bank highlighted fresh fruits and vegetables by making produce the first items encountered while walking through the food bank. As a result, the mean number of both fresh fruits and fresh vegetables chosen from the intervention food bank was significantly greater than the number of fresh fruits and vegetables chosen from the control food bank. This aligns with research done by Caspi et al. (2017) which suggested that the sales of fresh fruits and vegetables increased when produce was easily available and visible from the store entrance. The amount of canned and frozen fruits and vegetables chosen from each food bank was also assessed. In terms of vegetables, shoppers were more likely to choose the low sodium, healthier canned vegetables from the intervention food bank when compared to the control food bank. This could be attributed to the fact that the low sodium canned vegetables were highlighted and marketed as “healthy” at the intervention food bank, whereas all canned vegetables were shelved together regardless of sodium content at the control food bank. The number of frozen vegetables chosen was also significantly higher at the intervention food bank when compared to the control. However, because the mean number of chosen frozen vegetables at the control food bank was .00, it is questioned whether the control food bank was offering frozen vegetables at the time of data collection.

While the difference in numbers of fresh, canned, and frozen vegetables between the intervention and control all reached statistical significance, only fresh fruit was statistically significant. The variances in frozen and canned fruits between the two food banks were not statistically significant. Actually, the mean number of frozen fruit from both the control and

intervention food bank was .00. Thus, it can be inferred that both locations were not offering frozen fruit products at the time of data collection.

The total number of food items taken per participant statistically differed between the two food banks. On average, the control food bank users took significantly fewer food items than those at that intervention food bank. This could be attributed to the fact that the control food bank only allowed shoppers so many products from each food group, while there was no limit to the number of items the intervention food bank users were allowed to take. Furthermore, the control food bank users were restricted to filling one shopping cart, while the intervention food bank users could fill as many shopping carts or shopping bags as desired. Because the mean of the total number of chosen food items significantly varied between the two locations, the differences in the percent of items meeting the "healthy choice" criteria was assessed. The percent of items meeting "healthy choice" criteria from the intervention food bank was statistically greater than the percent of foods that met criteria from the control food bank. This indicates that even though participants who utilized the intervention food bank received a greater number of total food items, they still had a higher percentage of total foods that met the "healthy choice" criteria than those who shopped at the control food bank. This affirms the validity of this study's results, specifically, that highlighting nutritious food options increases the likelihood of food bank users choosing fresh fruits and vegetables, low sodium canned vegetables, frozen vegetables, nuts, margarine, and healthy dairy products.

The outcomes of this study produced novel information and established the efficacy of a free intervention that allows for the same access to foods, but serves to strategically promote healthy foods. Rearranging food banks to highlight healthier foods is a simple and no-cost intervention, requiring minimal to no additional equipment, space, or staffing. This intervention

does not eliminate food choices, but rather encourages food bank patrons to choose fresh produce, whole grains, and low saturated fat, low sugar, and low sodium canned goods. Additionally, this method opens doors for nutrition education to be available to food bank patrons, informing them on the beneficial effects of consuming nutritious foods. Therefore, by promoting healthy food products through the manipulation of the food bank layout, food banks have the opportunity to inspire food banks users to pick nutritious foods, possibly leading to a healthier population of food bank shoppers.

Limitations

This study had multiple limitations. First, demographic information was obtained exclusively through self-reported surveys. This method of data collection leaves room for error, and assumes all participants report accurate, truthful information. Additionally, in order to assess the number of items in each shopper's cart that met "healthy choice" criteria, researchers had to manually count all items. Therefore, the results of this study assume that researchers correctly counted and included all food items. Finally, this study may have been impacted by longitudinal effects. More specifically, data collection for the study spanned over the course of approximately one month per each food bank. Thus, the items offered in each food bank may have varied from week to week. This would imply that food bank shoppers did not have uniform access to the same exact foods for each day of data collection. However, because food banks operate solely on food donations, it is impossible for all food banks to offer the exact same products each and every day.

Future Studies

Currently, there are very few studies that have evaluated the efficacy of emphasizing healthy foods in food banks. In 2017, 11.8 percent of households in the United States reported

food insecurity, and thus, additional studies need to be conducted in order to gain more information about the food insecure population that utilize food banks (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2018). To confirm the results of this research, the methodology from the current study could be replicated in additional food banks in other geographic locations and at different times of year. The data for the current study was collected during summer months. Therefore, the food banks used in this study were offering a large quantity of fresh fruits and vegetables at the time of data collection. Accordingly, a potential area for further exploration would be to assess if different seasons impact the amount of fresh fruits and vegetables chosen at food banks. This study used manipulation of food bank layout to highlight healthy food options. However, future studies could focus on other interventions that promote healthy products. In general, food banks and the food insecure population tend to be under-researched. Hence, more studies should focus on these subjects in order to work towards an overall healthier food insecure population.

Conclusion

This study was strong in the fact that it produced novel information. Food banks are an under-studied area of research. There is a very limited number of studies that have evaluated the factors affecting the food-based decision making process for the food insecure. Additionally, very few studies have evaluated the effectiveness of highlighting healthy food products in a food bank setting. Therefore, the current study was one of the first of its kind. This study indicated that highlighting healthy food options increases the number of fruits, vegetables, nuts, dairy products, and margarine chosen by food bank users. This is significant data that can aid food banks and other similar settings by encouraging participants to choose nutritious food options,

potentially leading to a healthier population of those that would be food insecure without food banks.

Table 1. Participant Demographic Information

Participant Demographics	Control	Intervention	p-value
Gender (%)			p=0.401
Male	6 (16)	9 (26)	
Female	28 (74)	20 (59)	
Preferred not to answer	4 (10)	5 (15)	
Ethnic (%)			p=0.530
African American	4 (11)	6 (18)	
Asian	0 (0)	0 (0)	
White	26 (68)	24 (71)	
Hispanic/Latino	4 (11)	3 (9)	
Native American	0 (0)	0 (0)	
Other	4 (11)	1 (3)	
Age (%)			p=0.006*
18-25 years	3 (8)	1 (3)	
26-40 years	17 (45)	6 (18)	
41-64 years	17 (45)	18 (53)	
65+ years	1 (3)	9 (26)	
Number in household (standard deviation)	3.74 (1.75)	3.06 (2.47)	p= 0.180
Number of kids in household (standard deviation)	1.47 (1.35)	1.15 (1.74)	p=0.374
Disease in household (%)			p=0.666
None	20 (53)	12 (35)	
Heart Disease	0 (0)	0 (0)	
Diabetes	2 (5)	2 (6)	
Hypertension	6 (16)	6 (18)	
Heart Disease & Diabetes	0 (0)	1 (3)	
Heart Disease & Hypertension	0 (0)	1 (3)	
Diabetes & Hypertension	6 (16)	8 (24)	
Heart Disease, Diabetes, & Hypertension	4 (11)	4 (12)	
Role in food system at home (%)			p=0.573
Shop for Groceries & Prepare Meals	33 (87)	32 (94)	
Shop for Groceries, do not Prepare Meals	3 (8)	5.88%	
Prepare Meals, do not Shop for Groceries	1 (3)	0 (0)	
Neither Shops for Groceries, nor Prepares Meals	1 (3)	0 (0)	

*= p-value < 0.05 (statistically significant)

Figure 1. Mean Number of Items Meeting Criteria per Food Group

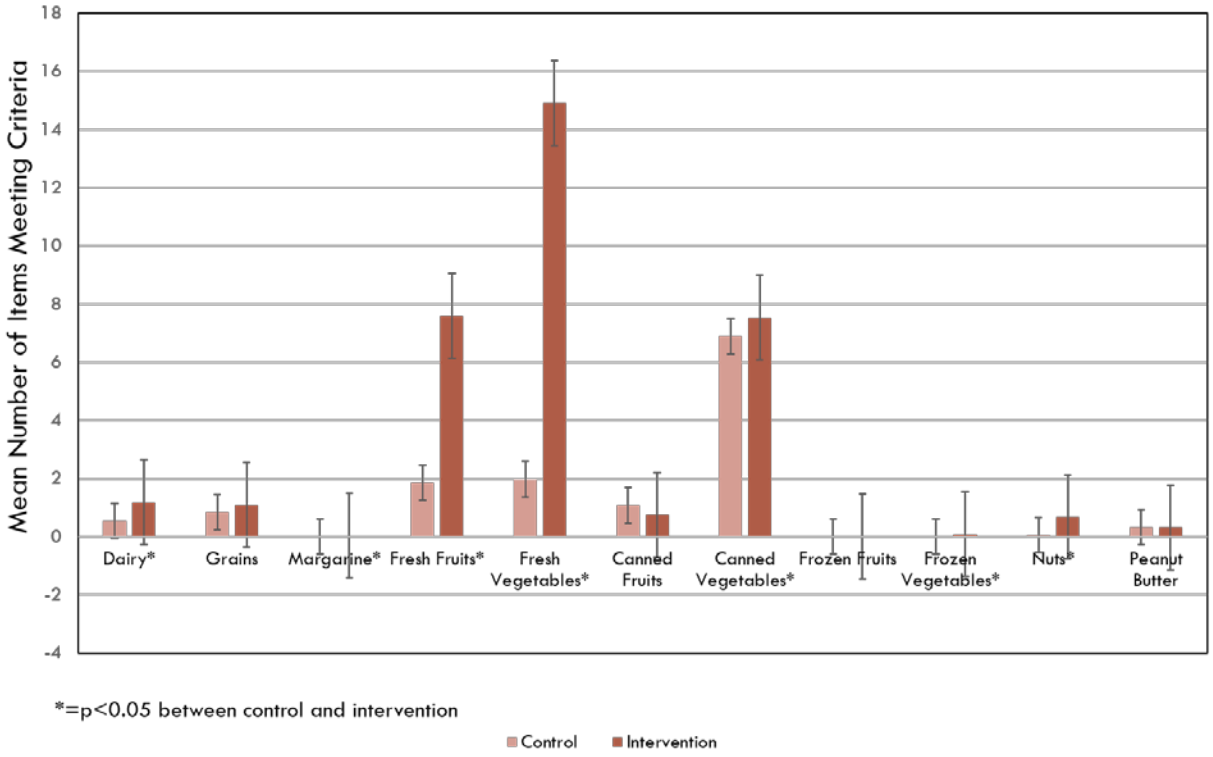


Figure 2. Total Number of Items per Shopping Cart

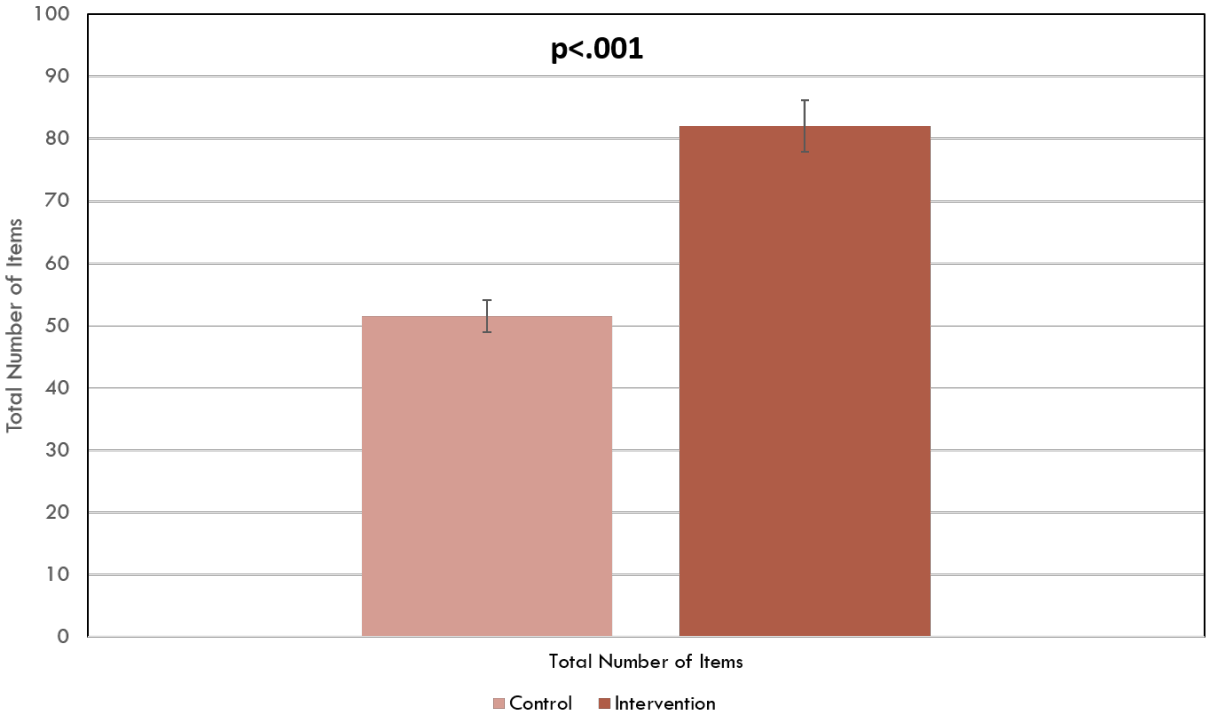
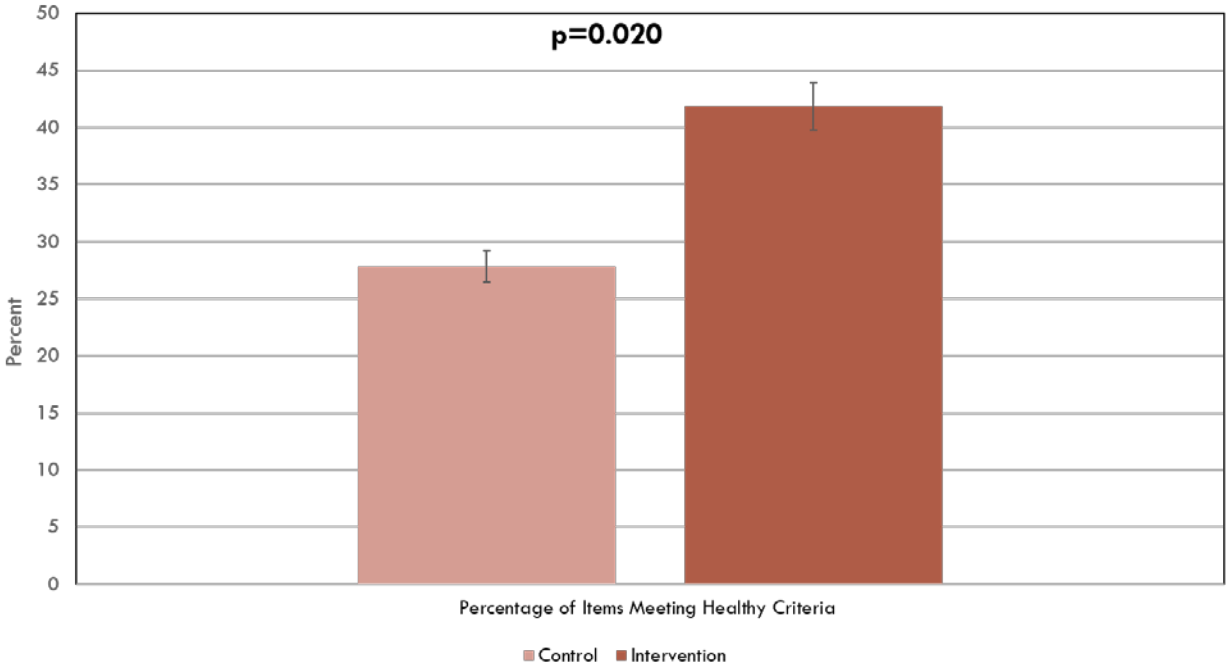


Figure 3. Percentage of Items Meeting Healthy Criteria



CHAPTER II: EXTENDED LITERATURE REVIEW

The association between diet and health is undeniable. Poor diet has consistently been associated with chronic illness and other detrimental health concerns. According to the 2015-2020 Dietary Guidelines for Americans (December 2015), approximately 117 million Americans have at least one preventable chronic illness, most relating to poor dietary choices and a sedentary lifestyle. Some of these conditions include cardiovascular disease, hypertension, type 2 diabetes, cancer, and poor bone health. Generally, a poor diet is one that is high in saturated fat, trans fat, added sugar, and sodium, and low in high fiber, nutrient-dense foods such as whole grains, fruits, and vegetables. In addition, a poor diet and lack of physical activity may lead to overweight or obesity. Obesity further increases the risk of developing the chronic diseases associated with poor diet.

The food insecure population may be at an additional increased risk for developing these nutrition-related chronic diseases due to factors that restrict their diet quality. Food banks and food pantries often offer foods that are non-perishable, which tend to be more processed and high in saturated and trans fats, added sugar, and sodium. Because of decreased shelf-life, fresh produce is typically limited at food banks. Multiple studies have been conducted to determine aspects of nutrition practices and general health among those who utilize food banks. For example, research by Robaina and Martin (2013), observed the associations between food security, diet quality, and body mass index among those who use food banks in Connecticut. Robaina and Martin collected data from 219 food bank users via interviewer-administered surveys. The surveys were meant to determine measures of food assistance use and food security, body mass index, diet quality, and general health, in adjunction to demographic information. In total, the researchers analyzed 212 surveys, and it was determined that only 7.5 percent of the

participants experienced high food security. Furthermore, results indicated that as level of food insecurity increased, consumption of fruits and vegetables decreased. In terms of body mass index, 72 percent of the food pantry participants were either overweight or obese. Additionally, many food bank users had been diagnosed with a chronic disease. Specifically, 26.4 percent had diabetes and 67.5 percent had been diagnosed with high blood pressure. A major limitation of this study is that, besides body mass index, all gathered information came from patient report.

Robaina and Martin's study (2013) looked at food insecurity's relationship with a wide variety of health conditions. However, other studies have been conducted that focus their attention on one specific illness or disease and how it is influenced by food insecurity. For example, Saiz et al. (2016) researched food insecurity and how it influences cardiovascular disease. Researchers used the Survey of the Health of Wisconsin (SHOW) to conduct a cross-sectional analysis. The survey included questions to determine food security as well as cardiovascular health. Survey participants were asked to respond with "poor," "intermediate," or "ideal" to questions regarding heart health. Of 2,935 people, 12 percent were identified as food insecure, and 72.2 percent were deemed in poor cardiovascular health. In terms of how heart health and food insecurity were connected, researchers determined that those experiencing food insecurity were more than half as likely to suffer from poor cardiovascular compared to those who were food secure (Saiz et al., 2016). Rather than study the link between cardiovascular disease and food insecurity, Tait, L'Abbe, Smith, & Rosella (2018), studied the relationship between type 2 diabetes and food insecurity. This longitudinal population-based cohort study used the 2004 Canadian Community Health Survey, the Ontario Diabetes Database, and a food frequency questionnaire to gather their information. After assessing the data, researchers

concluded that food insecure participants had double the risk (hazard ration=2.40) of developing type 2 diabetes when compared with food secure participants (Tait et al., 2018).

Food insecurity is not only associated with greater risks of major health concerns, but also with poor control of these health conditions. For example, a study by Berkowitz et al. (2015) observed food insecurity and how it plays a role in diabetes control and use of health care resources. They collected cross-sectional data at a primary care office, 2 community health centers, and 1 diabetes treatment center from 411 patients who had been diagnosed with diabetes mellitus. Of the 411 patients, 19.1 percent reported food insecurity. Furthermore, 46 percent of participants had poor diabetes control, meaning their hemoglobin A1c levels were greater than 9.0 percent. Because studies link food insecurity to greater risks of developing chronic disease and report poor control over such diseases, further research needs to be conducted to determine ways to better the diet quality while decreasing food insecurity of food bank users.

Current Food Bank Nutrition Practices

Food banks and food pantries are an under-researched area of nutrition. However, there have been a handful of studies done in the past to provide insight on amount and quality of product offerings, as well as food bank policies and procedures. Though healthy choices may sometimes be hard to come by, those who utilize food banks still want access to healthier foods. According to the Hunger in America 2014 National Report prepared for Feeding America (2014), 55 percent of food bank users reported their most desired items were fresh fruits and vegetables, 47 percent wanted healthy protein options, and 40 percent wished for more dairy products (Mills et al., 2014). In response to this influential survey many efforts have been made to increase the amounts of these healthy products in food banks nationwide. Feeding America has been especially proactive in their attempts to increase the availability of healthy foods to the

food insecure population by educating donors on healthy foods that can be donated to food banks. Even though fresh produce, whole grains, and low sodium, added sugar, and saturated fat products are becoming more available to food bank participants, studies still need to be conducted on how to effectively market these healthier products to food bank clients.

For example, Handforth, Hennink, and Schwartz (2013) piloted a qualitative study to assess nutrition-related policies and practices of twenty food banks. The food banks used in the study varied in size and geographic location, but were all members of the Feeding America Network. Handforth et al. conducted interviews with directors, chief executive officers, and nutrition-related staff from each food bank. Participants were asked twelve open-ended question to determine attempted nutrition-related initiatives, what barriers the food bank had to overcome to implement the nutrition initiative, and effectiveness and community feedback of the initiative. A major theme throughout most of the interviews was the need for establishing nutrition-profiling systems and policies, nutrition-profiling systems being different means to determine nutritional quality of a variety of products. While some of the studied food banks already had nutrition policies and a nutrition-profiling system, close to half of the food banks had no profiling or policies at all. Furthermore, a handful of the food banks were in the planning phase of implementing nutrition initiatives to increase health product availability. A debated issue that arose from the interviews was whether or not food banks should have policies regulating the nutritional quality of foods they distribute. Because food banks operate on donations, many of the food bank employees thought that prohibiting certain foods would decrease the number of donors, and therefore, the number of available items at the food banks. However, interviews suggested donor education as a way to increase the number of healthy foods that are given to the food banks. Finally, interviewees wished to distribute more fresh produce, but struggled to

determine a way to avoid the produce going bad due to their shorter shelf-life than the commonly donated non-perishable foods. In general, this qualitative study called for future studies seeking ways to increase healthy nutrition initiatives in food banks (Handforth et al., 2013).

A recent study by Martin, Wolff, Callahan, and Schwartz (2018), was conducted because the researchers saw the need for a nutrition-ranking system to be used in food banks. Their hope was that the nutrition-ranking system they would create could promote healthy food options, potentially leading to a decrease in incidences of chronic disease in food bank users. Therefore, Martin et al. created SWAP (Supporting Wellness at Pantries), a first of its kind system of ranking nutritional quality of food bank products. In order to form SWAP, researchers studied a variety of existing systems for nutrition ranking. Some nutrition ranking systems that have been studied and utilized in the past including the "Go, Slow, Whoa" traffic light food labeling system, the Foods to Encourage (F2E) list from Feeding America, and the Nutrient Rich Foods system which is used by MAZON, an organization created to combat food insecurity. While creating the SWAP system, Martin et al. took into account the good aspects from these current food labeling systems, while also determining ways to overcome the gaps in these current structures. The finished product included eleven food categories: fruits, vegetables, grains, animal proteins, plant proteins, dairy, cheese, meals/ combination foods, snacks/desserts, beverages, and condiments. The researchers created basic guidelines for each category for saturated fat, sugar, and sodium content loosely based off the 2015-2020 Dietary Guidelines for Americans. Much like the "Go, Slow, Woah" system, the SWAP foods were either deemed green for choose often, yellow meaning choose sometimes, or red meaning choose rarely based on the fat, sugar, and sodium guidelines. Green, yellow, and red labels were put on food bank shelves next to the corresponding items and posters explaining SWAP were hung around the food bank.

Additionally, products that were labeled as green were put on shelves at eye-level, while red products were strategically placed in less significant locations. After the SWAP system had been created, researchers tested SWAP in six Connecticut food banks for two months. After two months of testing, 54 food bank workers were surveyed to determine the pros, cons, and efficacy of SWAP. The surveys concluded that 70 percent of the workers liked the system, 68 percent liked that it was easy to use, and 60 percent thought it helped their food bank request that healthier products be donated. A major implication of this study is that the efficacy of the SWAP system was not determined based on data from actual food bank users. Therefore, future studies that measure how SWAP influences food bank shoppers' decisions would be beneficial (Martin et al., 2018).

Effects of Highlighting Nutritious Foods

There are limited research studies on the effects of emphasizing healthy food products in a food bank or food pantry setting. However, many studies have been conducted on the effects of highlighting healthy foods in multiple other locations. For example, Driskell, Schake, and Detter (2008) assessed how nutritional labeling impacts food choices of college students in a university dining hall. Researchers utilized Nutrition Bytes labels on the products for sale in the dining center, then had participants complete a fifteen-item questionnaire on their use of the food labels. Results concluded that a significant number of students changed their food selections based on the nutrition label when eating inside the dining hall. Furthermore, women were more likely to read the food labels and make food choices based on the ingredient list and serving sizes in comparison to men. Conversely, males were more interested than the females in using the food labels to determine protein content. Overall, this study indicated that food labels may increase

the amount of healthy foods that are purchased in the university dining hall setting (Driskell et al., 2008).

Furthermore, Thorndike, Riis, Sonnenberg, and Levy (2014) conducted a study in a hospital cafeteria to determine effects of highlighting healthy foods by using a traffic-light labeling system for twenty-four months. The traffic-light labeling system included tagging each item as red, yellow, or green. Color was assigned based off of fruit and vegetable, whole grain, lean protein/low fat dairy, saturated fat, and caloric content. Green items were deemed more nutritious than red items, while foods with yellow tags were nutritionally somewhere in between. Three months into the study, researchers altered the layout of the cafeteria to promote the green items, while hiding red items. Thorndike et al. used sales to measure primary outcomes. After two years, researchers determined that sales of green-labeled foods increased by five percent, while the amount of red-labeled foods decreased by four percent. In terms of beverages, green beverage sales increased by eight percent, while red beverage sales went down by nine percent. Because this was a longitudinal study, results suggest highlighting healthy foods may promote healthy long-term lifestyle changes, specifically in a hospital cafeteria setting (Thorndike et al., 2014).

Similarly, Kleef, Otten, & Trijp (2012) examined the influence of manipulating the shelf layout in a hospital store setting. Researchers manipulated a store checkout display filled with both healthy and unhealthy snacks in an attempt to encourage consumers to purchase healthy snacks. Researchers looked at consumer choices when the display consisted of seventy-five percent healthy snacks and twenty-five percent unhealthy snacks, and seventy-five percent unhealthy snacks with twenty-five percent healthy snacks. Results determined that healthier snacks were purchased more frequently than unhealthy options when checkout counter shelves

highlighted and consisted of seventy-five percent healthy snacks. This study shows that consumers may still pick healthier options, even when unhealthy choices are available (Kleef et al., 2012).

Winkler et al. (2016) sought to determine customers' feelings and evaluate influence on sales of a healthy checkout supermarket intervention. To begin, researchers conducted a qualitative pre-intervention study to determine consumer attitudes towards unhealthy snack exposure in grocery stores. This information was obtained through in-store interviews, semi-structured interviews, and focus groups. The information from the pre-intervention study was presented to grocery stores, and researchers were given permission to form an intervention at four stores. The goal of the intervention was to decrease unhealthy foods at checkout counters, while increasing healthy food promotions at checkout counters. Sugar-laden snacks lining checkout counters were replaced with fruit and vegetable snacks. The intervention lasted four weeks and exit interviews were conducted afterward. The exit interventions showed that consumers were excited and positive about the intervention, claiming they thought the intervention would aid others and themselves in making healthier choices at the supermarket. Statistical analyses were completed in order to determine the intervention's influence on store sales. This data suggested an increase in sales of carrot snack packs, but no other significant differences in other healthy items compared to the sugary snacks. Though results of this research were largely non-significant, the study was very modest in size. Researchers concluded that further research was necessary, and that re-creating this study on a larger scale may produce significant data (Winkler et al., 2016).

Wong et al. (2015) conducted a study to determine how product placement influences adolescent beverage choices in six small, privately owned retail stores. Researchers sought to

quantify how product placement affected sales of non-sugar sweetened beverages. The non-sugar sweetened beverages were purposefully placed in the coolers closest to the stores' entrances, keeping in mind horizontal distance from the back of the store, as well as vertical placement on the shelf. Results of the study showed that the probability of purchasing the beverages was highest when the product was in the cooler closest to the store entrance on shelves that were eye-level. These results suggest that specific product placement can increase sales of healthier beverages in an easy, yet effective way (Wong et al., 2015).

In other previous research, Turner, Skubisz, Pandya, Silverman, and Austin (2014) performed a study to determine to what extent people pay visual attention to the information provided by nutrition labels and front-of-package nutrition symbols. Results concluded that those who were motivated to shop for nutritious foods spent significantly more time looking at the available nutrition information when compared to people who were simply shopping based on taste preferences (Turner et al, 2014).

Wilson, Just, Swigert, and Wansink (2016), directed a study evaluating the efficacy of nudges toward targeted foods in a food pantry setting. Researchers utilized a food pantry in New York and manipulated the display of nutrition bars. Researchers hoped that product manipulation would encourage shoppers to choose the healthier protein bar rather than cakes, cookies, brownies, etc. They determined how often the targeted product was chosen when it was placed in the front or the back of the dessert line. Additionally, they assessed how often the nutrition bars were taken when the product was in its original packaging versus unboxed. In total, Wilson et al. collected data from 443 food pantry users and measured the rate of which the targeted product was taken, the proportion of clients that chose the targeted nutrition bars, and the binary choice to establish whether nudging the nutrition bars increased their selection. Results of the study

demonstrated that the nutrition bars encountered prior to the desserts were chosen more often than the bars shelved after all the desserts. In addition, products in their original packaging were chosen more frequently than items that had been re-packaged. It was hypothesized that keeping food in the original box "may remove the stigma of receiving the product from the food pantry" (Wilson et al., 2016). Although conducted in a food pantry unlike most previous studies, the study had a couple limitations. Primarily, the study was only conducted at one site for one month. Furthermore, researchers only studied effects of highlighting one product. In future studies, researchers may get a broader range of results by including more than one product in their intervention.

Overall, many of these previous studies tested the effectiveness of highlighting nutritious foods on influencing healthier consumer food decisions, and most results suggest that highlighting nutritious foods will positively impact consumer food choices. Nonetheless, the previous literature lacks solid studies on nudging consumers to choose healthy food items in the food bank or food pantry setting.

Factors Affecting Consumer Food Choices in the Low Socioeconomic Population

Apart from studying the effects of highlighting nutritious foods, it is important to identify specific factors that influence food choices for those of low socioeconomic status. Caspi et al. (2017) targeted their study at the low socioeconomic population by assessing if stressing healthier options in small grocery stores, gas-marts, pharmacies and dollar stores swayed customer purchases. The thought behind the study was that those who shop for food in venues such as dollar stores and gas stations tend to be of low socioeconomic status, and the food provided at such locations tends to be of poor nutritional quality. Ninety-nine stores were assessed and given a Healthy Food Supply Score (HFSS) based on availability, price, quality,

and variety of inventory of their products. Availability of fresh fruits and vegetables and whole grain products was also taken into account. Additionally, researchers inventoried carts and bags after shoppers had purchased their groceries, as well as collected a demographic survey. Researchers found that only about eight percent of shoppers purchased fruits and vegetables and/or whole grain products. Regardless, it was determined that sales of fruits and vegetables increased when the produce was easily available and visible from the store entrance. Location of whole grain products did not affect sales (Caspi et al., 2017). In a closely related study, Foster et al. (2014) studied in-store marketing strategies that draw attention to healthier products in supermarkets located in low-income neighborhoods. Researchers specifically analyzed milk, cereal, frozen meals, in-aisle beverages, and checkout cooler beverages. Researchers compared four supermarkets that received an in-store marketing intervention that promoted the sales of healthier products through placement, signage, and product availability strategies to four stores with no intervention. After measuring weekly sales for six months, researchers determined that store manipulation can significantly enhance the sales of healthier food items in multiple categories. More specifically, there were significantly greater sales of skim and 1% milk, water, and 2 of 3 types of frozen meals compared to the control store. Nonetheless, no differences were found between the stores in sales of cereal, whole or 2% milk, beverages, or diet beverages (Foster et al., 2014). Similarly, Gamburzew et al. (2016) utilized a six month intervention via shelf labeling and marketing to determine if highlighting healthy foods would increase product sales in stores in disadvantaged neighborhoods. Results showed significantly more purchases of healthy starches, fruits, and vegetables in the intervention stores when compared to the controls (Gamburzew et al., 2016).

Thorndike et al. (2016) conducted research to study if increasing fresh produce visibility and quality would increase purchases of fresh produce by families utilizing Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Six stores in urban, low-income areas of Massachusetts participated in this study. Three stores were used as controls, while three displayed the intervention. Control stores remained the same while intervention stores underwent "choice architecture intervention." Each intervention store was altered in slightly different ways in order to best increase produce quality and visibility. Intervention store owners talked with a "produce consultant" who advised them on produce stocking strategies to keep high quality produce. The intervention lasted five months. Afterwards, researchers assessed their data, the primary outcome being the redemption of the WIC fruit/vegetable cash-value vouchers. Additionally, researchers used exit-interviews to determine customers' self-reported purchases of fresh produce. When compared to baseline, research determined that WIC fresh produce sales increased in intervention stores by $40/month, but decreased in control stores by $US 23/month. Exit interviews confirmed these sale statistics, although not statistically significant (Thorndike et al., 2016).

Kamphuis, Bekker-Grob, and Van Lenthe (2014) conducted a study to determine differences in food motives between high and low socioeconomic populations. Researchers interviewed participants, seeking specific characteristics that impact food choices. Attributes consisted of taste, health concerns, preparation time, travel time to shops, and cost consideration. After concluding interviews and analyzing the data, it was determined that those of low socioeconomic status did not value health in their food choices as much as those with higher incomes (Kamphuis et al., 2014). Similarly, Lovelace and Rabiee-Khan (2015) conducted a small-scale qualitative study to determine what effects the diets of young children in low income

families in the UK. Researchers conducted semi-structured interviews with eleven mothers, seeking information about their children's' diets, nutritional knowledge of parent, and financial constrictions. The results of the interviews showed that many parents wanted to provide their children with nutritious foods, but did not have the means or knowledge to do so. Furthermore, when these low income parents attempted to provide healthy diets for their children, the parents' dietary habits also slightly improved. Unfortunately, because this was a qualitative study with a very small sample size, the results cannot be generalized (Lovelace & Rabiee-Khan, 2015). Smith, Parnell, Brown, & Gray (2013) also assessed food purchasing practices in low income families. In their study conducted in New Zealand, researchers compared types of foods purchased with level of food insecurity. They determined that fruits, vegetables, and cereals were purchased less frequently by those who were most food insecure compared to those with moderate food security (Smith et al., 2013). These previous studies provide valuable insight on the decision making process behind those of low socioeconomic background when making food choices.

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APPENDIX A: CRITERIA FOR DESIGNATION ON HEALHTY CHOICES SHELF

Criteria for designation on Healthy Choices Shelf

Jennifer Barnes, RDN & Kimberly McClintic, RDN

Grains (pasta, rice, cereal, bread, crackers, granola bars)

1. ≥3g fiber per serving –OR- 1st ingredient whole grain
2. ≤20% daily value of sodium per serving
3. ≤10g of sugar per serving
4. ≤10% daily value of saturated fat per serving
5. 0g trans fat per serving

Canned Fruit

Label that states 1 of the following:

1. Packed in light syrup
2. Packed in own juice
3. Packing in water
4. No sugar added

Canned Vegetables

1. ≤20% daily value of sodium per serving

   –OR-

   Label that states 'No Salt Added' or 'Reduced Sodium'

Beans

1. Unseasoned canned beans
2. All dried beans

Oils

1. Liquid at room temperature

Peanut Butter

1. Any with ≤8 g sugar per serving

Spices and Herbs

1. Salt-free blends
2. Single ingredient herb or spice
3. Salt substitutes

Non-Perishable Dairy

1. ≤12g sugar per serving
2. Dry skim milk powder

Nuts and Seeds

1. ≤20% daily value of sodium per serving
2. Unsalted

*If in doubt of any of the above or a new food item, refer to Grains criteria as this is most comprehensive.

Refrigerated and Frozen Foods

Note that this may be quite difficult to execute due to space and signage options. That being said, this is the criteria we would recommend if able to move forward with these foods.

Dairy

1. ≤5g fat per serving
2. Skim or 1% milk
3. ≤20g sugar per serving for yogurt

Meat, Poultry, Fish

1. Signage might be most appropriate here with notes on lean cuts, skinless, unbreaded

Margarine

1. 0g trans fat

Hummus, frozen meals, labeled and prepared fresh foods (ex. Premade sandwiches, salads, etc)

1. ≤20% daily value of sodium

Frozen Vegetables

1. Unseasoned, no sauce
2. Single ingredient or only vegetables on ingredient list for blends

Frozen Fruit

1. Unsweetened/no sugar added
2. Single ingredient or only fruits on ingredient list for blends

Beverages

1. Unsweetened tea (prepared or pkg)
2. 100% fruit/vegetable juices
3. Sugar-free powder mixes

APPENDIX B: DEMOGRAPHIC DATA COLLECTION FORM

For Researchers: PLEASE DO NOT WRITE YOUR NAME ON THIS FORM

Participant code _____

ILLINOIS STATE UNIVERSITY
Illinois' first public university.

Demographic Data Collection Survey

1. What is your gender? _____Male _____Female _____Prefer Not To Answer
2. What is your ethnicity? (Check all that apply)

   _____African American/Black

   _____Asian

   _____White

   _____Hispanic/Latino

   _____Native American

   _____Other:_____

3. What is your age?

   _____18-25

   _____26-40

   _____41-64

   _____65+

4. How many people occupy your household? _____
5. How many children under the age of 18 occupy your household? _____
6. Does any member of your household suffer from a listed chronic diseases? (Check all that apply)

   _____Heart Disease _____ Diabetes _____High Blood Pressure

7. How many times per month do you utilize a food bank? _____

8. What is your primary role in your food system at home?

   _____shop for food and prepare all meals

   _____shop for food, but do not prepare meals

   _____do not shop for food, but do prepare most meals

   _____typically neither shop for food, nor prepare meals

APPENDIX C: INVENTORY CHECKLIST FORM

Product	Fiber	Sodium	Sugar	Sat/Trans Fat	Other	# of Items Meeting Criteria
Grains	≥3g fiber per serving OR 1st ingredient whole grain	≤20% daily value of sodium per serving	≤10g of sugar per serving	≤10% daily value of saturated fat per serving AND 0g trans fat per serving		
Fresh Fruits	ALL FRESH PRODUCE MEETS CRITERIA					
Fresh Vegetables						
Canned Fruits			Packed in water, OR packed in own juice, OR packed in light syrup, OR no sugar added			
Canned Vegetables		≤20% daily value of sodium per serving OR Label that states 'No Salt Added' or 'Reduced Sodium'				
Frozen Fruit			Unsweetened/no sugar added		Single ingredient or only fruits on ingredient list for blends	
Frozen Vegetables		Unseasoned, no sauce			Single ingredient or only vegetables on ingredient list for blends	
Peanut Butter			Any with ≤8 g sugar per serving			
Nuts		Unsalted OR ≤20% daily value of sodium per serving				
Dairy			≤20g sugar per serving for yogurt	≤5g fat per serving OR Skim or 1% milk		
Margarine				0g trans fat		

Total # Items in Shopping Cart: